AbstractID: 13353 Title: Multi-institution comparison of Varian linac electron commissioning data: application to Eclipse Generalized Gaussian Pencil Beam Algorithm commissioning.

Purpose: To point out clinically relevant issues in the commissioning process of the Eclipse Generalized Gaussian Pencil Beam (GGPB) algorithm and to post a multi-institution comparison of Varian linac electron commissioning data. Research was performed to quantify the accuracy of commissioning a treatment planning system using either Varian "golden beam data" or common data for several linacs. Using such data may be a useful option for clinics installing or replacing a linac, with the need to make the transition with minimal down time. This work seeks to address whether or not such techniques are clinically acceptable.

Method and Materials: Graphical techniques were used to compare the electron commissioning data from multiple independent Varian linacs. The performance of the Varian "golden beam data" for beam modeling using the Eclipse GGPB algorithm was examined by comparing calculations to measured dose distributions as well to calculations made with a fully commissioned pencil beam algorithm in CMS Xio.

Results: Depth dose curves from the various independent linacs were typically found to be within a 3 mm distance to agreement, with the Varian "golden beam data" falling within an approximate 5 mm distance to agreement. Comparisons between CMS Xio and Eclipse showed that Eclipse depth dose profiles are less smooth and tend to contain calculation algorithm artifacts.

Conclusion: Although good agreement was found between the commissioning data of the clinics in this study, special care should be taken when using data from another linac to commission a treatment planning system. With careful adjustment of the modeling parameters in the treatment planning systems it may be possible to achieve calculation accuracy that is within a clinically acceptable tolerance. However, if optimal accuracy is desired, a full set of commissioning data should be collected for the specific linac being modeled.